Drinking Water Safety Advisory Committee
Fourth Meeting

Date : 2 July 2019 (Tuesday)
Time : 3:10 p.m. to 5:50 p.m.
Venue : 12/F, 1063 King's Road, Quarry Bay

Minutes of Meeting

Members Present

Ir LEUNG Kwong Ho, Edmund	Chairman
Ir Dr CHAN Hon Fai	Vice Chairman
Dr CUNLIFFE David Anthony	
Prof HO Kin Chung	
Prof LAU Kar Pui, Susanna	
Ir Prof LO Man Chi, Irene	
Dr MA Yiu Wa, Anthony	
Prof TSE Lap Ah, Shelly	
Dr WONG Siu Ming, Raymond	
Dr WONG TAAM Chi Woon, Vivian	
Mr WONG Chung Leung	Director of Water Supplies
Mr CHAU Siu Hei, Francis	Deputy Secretary for Development (Works) 3
Dr HO Ka Wai, Rita	Consultant Community Medicine (Non-Communicable Disease), Department of Health ("DH")
Mr KAN Yim Fai, Fedrick	Secretary Team Leader (Water Safety), Development Bureau ("DEVB")

Members Absent with Apology

Mr HO Kui Yip, Vincent

Ir WONG Yiu Sun, Peter

In Attendance

Mr CHU Siu Ki, Alex	Chief Assistant Secretary (Water Safety), DEVB
Ms FOK Ka Lai	Assistant Secretary (Water Safety) 1, DEVB
Ms YEUNG Man Yan, Didi	Executive Manager (Water Safety), DEVB
Mr CHAU Sai Wai	Deputy Director of Water Supplies
Mr LAM Saint Kit, Byron	Assistant Director/Special Duty, Water Supplies Department ("WSD")
Mr KWOK Yau Ting, Kelvin	Chief Chemist, WSD
Mr CHAN Chi Yuen, Stanley	Chief Engineer/Special Duty, WSD
Mr YU Chi Wing	Senior Chemist/Water Quality (Standards and Monitoring), WSD
Mr LUI Wing Kit, Ricky	Senior Mechanical Engineer/Material Testing Laboratory, WSD
Mr LO Tsz Lung, Warren	Senior Engineer/Technical Support (2), WSD

Action by

1. The Secretary reported that DWSAC Paper No. 1/2019 on the annual water quality statistics under the Enhanced Water Quality Monitoring Programme ("Enhanced Programme") in 2018 had been circulated to Members on 24 January 2019. The Secretary also recapped that the test results of the water samples collected under the Enhanced Programme in 2018 showed that the contents of the six metals in the drinking water of all premises randomly selected for sampling were in compliance with the corresponding standard values of the Hong Kong Drinking Water Standards ("HKDWS") in accordance with the Two-Tier sampling protocols. No comment had been received from Members on the Paper. The annual water quality statistics in 2018 were published in WSD's website in February 2019.

Agenda Item 1: Confirmation of Minutes of the Last Meeting

2. The Secretary had circulated the draft minutes of the third meeting on 23 January 2019 to Members and no comment had been received. There being no further comments from Members, the minutes of the last meeting were confirmed.

Agenda Item 2: Matters Arising from Last Meeting

3. Regarding the commissioning requirements of new plumbing systems *(paragraph 6 of the minutes of the last meeting)*, WSD would report the results of the trials of collecting water samples with a stagnation period of 24 hours for commissioning test in Agenda Item 3 below. WSD would also report the results of trials of leaching test of plumbing material conducted in accordance with overseas standards *(paragraph 7 of the minutes of the last meeting)* in Agenda Item 3 below.

4. In connection with a Member's concern about the water quality at schools as well as their implementation of Water Safety Plans for Buildings ("WSPB") *(paragraph 13 of the minutes of the last meeting)*, Mr Alex CHU, Chief Assistant Secretary (Water Safety) of DEVB, reported that DEVB and WSD had met the Education Bureau in early 2019 for exploring ways to encourage schools to implement WSPB. The meeting agreed that the Government should lead by example and implementation of WSPB at Government schools would be explored so as to encourage other non-Government schools to follow suit. He also reported that one secondary school had been awarded a certificate under the Quality Water Supply Scheme for Buildings – Fresh Water (Management System) ("QMS") for implementing WSPB while another secondary school was preparing to implement WSPB and make an application for the QMS. Moreover, schools had been reminded to implement effective measures to minimise the risk of exposure of the students to drinking water of sub-standard quality such as flushing the taps in morning and before lunch break. Members had no further comment in this respect.

Agenda Item 3: Updates on Action Plan for Enhancing Drinking Water Safety in Hong Kong ("Action Plan")

5. Mr Kelvin KWOK, Chief Chemist of WSD, updated Members on the latest situation of the implementation of the Action Plan.

6. The Chairman asked if WSD would make use of the data collected under the Enhanced Programme to correlate the water quality with the material used in the plumbing system. Mr Kelvin KWOK replied that WSD would conduct a review after collecting data under (i) the Enhanced Programme in three to five years' time, (ii) the commissioning tests of new plumbing systems and (iii) the Surveillance Programme for testing of randomly procured General Acceptance ("GA")

plumbing products. The correlation of the water quality with the material used in the plumbing system could form part of the review.

7. In response to a Member's enquiry of any discrepancy between the water sampling test results in the Enhanced Programme and those in the lead-in-water incident in 2015, Mr Kelvin KWOK advised that different sampling protocols had been adopted for the Enhanced Programme and lead-in-water incident. Mr CL WONG, the Director of Water Supplies, added that the Two-Tier sampling protocol used in the Enhanced Programme was recommended by the International Expert Panel on Drinking Water Safety ("IEP"), which could better reflect the exposure of the consumers to metals through the drinking water. Mr CL WONG further pointed out that, under the Enhanced Programme, premises were randomly selected from all water accounts for sampling. Therefore, the premises selected under the Enhanced Programme might not be the same premises where water samples had been taken during the lead-in-water incident in the public rental housing ("PRH") estates.

8. A Member asked about the reason behind the difference between the stagnation time used in leaching test for plumbing materials and that for commissioning test of new plumbing systems. Mr Kelvin KWOK responded that the two tests served different purposes. For commissioning test of new plumbing systems, a stagnation time of 6 hours had been adopted in order to ensure that systematic flushing had been properly conducted for the new system to reduce metal leaching from the new pipes and fittings which were more prone to metal leaching.

9. A Member enquired about Random Daytime ("RDT") sampling in monitoring lead contamination of drinking water in existing buildings in Hong Kong. Mr Kelvin KWOK responded that the Two-Tier sampling protocol comprising collecting RDT sample and 30-minute stagnation ("30MS") sample was recommended by IEP with due regard to the fact that exceedance in RDT sample could be due to unduly long stagnation time before sampling or sporadic presence of metal particles. The 30MS water sample would only be tested if there was exceedance in the RDT sample to verify the metal exposure of consumers. Mr CL WONG supplemented that a comprehensive water sampling test programme was conducted at all PRH estates in 2015. The comprehensive programme had effectively distinguished 11 affected PRH estates built after 2005, in which the inside service had been found using leaded solders, from other PRH estates. In fact, non-copper pipes or copper pipes using mechanical joints were used in PRH estates built before 2005, whilst private developers normally used

brazing for copper pipes instead of solder for connecting copper pipes in their buildings. Based on the results of Enhanced Programme, which covered both PRH estates built before and after 2005 as well as private buildings, the overall risk of lead exceedance in drinking water was low in general. Nevertheless, WSD would continue monitoring the water quality in the territory under the Enhanced Programme.

Agenda Item 4: Review of the Drinking Water Quality Monitoring Programme
(DWSAC Paper No. 2/2019)

10. Mr Kelvin KWOK briefed Members on the review results of the Drinking Water Quality Monitoring Programme in Hong Kong. He reported that the Water Research Centre of the United Kingdom had been commissioned to conduct a review study ("the Study") on the overseas and local practices in drinking water quality monitoring. The Study recommended certain revisions to WSD's monitoring programme including the monitoring locations, monitoring frequencies and sampling protocols for individual parameters in the HKDWS, Surveillance List, Aesthetic Guidelines and Watch List.

11. As consumers were generally concerned about whether their drinking water supply was safe or not, it was proposed to take additional water samples at randomly selected consumers' taps ("CTs") in conjunction with the Enhanced Programme for testing of the two health-based parameters, i.e. *E. coli* and residual chlorine in HKDWS. WSD would enhance public awareness on the proposed arrangement of taking the additional water samples in conjunction with the Enhanced Programme through various publicity channels prior to its implementation tentatively scheduled for early-2020.

12. The Chairman asked if any changes would be made to the current drinking water quality monitoring programme at locations upstream of the connection points. Mr Kelvin KWOK explained that the monitoring frequencies for some of the parameters would be increased in accordance with the recommendations of the Study.

13. Regarding the monitoring frequencies, a Member suggested WSD, for consistency sake, presenting the calculation of the sampling rates based on a unified population size and the sampling rate for each parameter could then be determined according to its risk. Mr CL WONG welcomed the suggestion and

advised that WSD would consider adopting a unified population size, say 100 000, as denominators for calculation of the sampling rates for individual parameters. In response to another Member's request, WSD would also take into account the population sizes of the 18 District Council Districts ("DCDs") in Hong Kong in the calculation.

14. A Member suggested that pH could also be tested in the water samples collected at random CTs onsite in conjunction with the Enhanced Programme. In response, Mr Kelvin KWOK advised that normally the pH level of the treated water should not vary significantly along the water distribution network and the risk of having the pH value exceeding the Aesthetic Guideline values of 6.5 to 9.5 should be extremely low. Furthermore, there were technical difficulties for WSD's sampling teams to perform pH tests onsite as the sampling teams were not trained laboratory technicians. Mr CL WONG added that the pH level of the treated water had been monitored by online analysers at outlets of the water treatment works. In view of WSD's response, Members suggested that WSD conduct pH tests onsite simply by using pH papers in order to verify any significant variation in pH value of the treated water as high accuracy was not necessary. WSD would consider Members' suggestion. **WSD**

[Post-meeting note: WSD had reviewed the proposal of conducting pH test in conjunction with the Enhanced Programme. According to overseas jurisdictions, the reasons for monitoring pH level in drinking water were two-fold: as an aesthetic parameter and its impact on optimal disinfection. Since pH level in drinking water would be continuously monitored by online analysers at outlets of WTWs in Hong Kong and it should not vary significantly along the water distribution network, the risk of the pH level exceeding guideline value of the Aesthetic Guidelines in the range of 6.5 - 9.5 would be extremely low. On the other hand, the use of pH paper for monitoring purpose was too crude to provide useful information. From the risk and cost-effectiveness point of view, it would not be justifiable to conduct pH test in conjunction with the Enhanced Programme.]

15. The meeting also discussed about testing of total coliforms and Heterotrophic Plate Count ("HPC"). A Member recommended that WSD should test either total coliforms or HPC since they both serve the same purpose whereas another Member recommended deleting HPC from the water quality monitoring programme as other parameters under monitoring already served the same purpose. Mr Kelvin KWOK explained the need to monitor each of these parameters and he particularly pointed out that HPC would provide forewarnings to WSD on the microbial quality

of drinking water.

[Post-meeting note: WSD had reviewed the Members' comments on the monitoring of total coliforms and HPC. According to overseas jurisdictions including WHO, monitoring of HPC could detect a wider range of micro-organisms and the test results would be more sensitive in indicating cleanliness, integrity and disinfection in the water supply system. Besides, testing of total coliforms would provide an additional analytical tool for operational control of drinking water quality, as well as additional information for the evaluation and investigation upon detection of exceedance of E. coli. Since monitoring of these two parameters was commonly practised by many drinking water utilities worldwide, it was recommended that the WSD's current practice of monitoring these two parameters should be retained.]

16. A Member noted that the reason for taking water samples at Publicly Accessible Consumers' Taps ("PACTs") for testing disinfection by-products ("DBPs") was to minimize disturbance to the public. However, he enquired whether WSD would take water samples for testing DBP when they gained access for taking water samples under the Enhanced Programme. Mr Kelvin KWOK explained that the concentration of DBPs would not be affected by the internal plumbing systems. According to the consultant's recommendations, they should be monitored at the extremities of the water supply system. Alternatively, water samples could be taken at PACTs. Members noted.

17. Dr Rita HO, Consultant Community Medicine (Non-Communicable Disease) of DH, noted that the annual number of water samples to be collected at randomly selected CTs in domestic premises for testing *E. coli* and residual chlorine appeared to be very small when compared with that to be collected at PACTs in non-domestic premises (i.e. 670 vs 17 000). As residential CTs were key sources of drinking water, she expressed concern on the representativeness of the small number of samples to be taken at these premises. Mr Kelvin KWOK clarified that it was proposed to take 17 600 samples at PACTs. Riding on the opportunity of gaining access to various premises under the Enhanced Programme, an extra 670 samples would be taken at randomly selected CTs in conjunction with the Enhanced Programme. Mr Kelvin KWOK advised that the statistics of the two sets of monitoring results would be correlated to assess the quality of drinking water from randomly selected CTs and PACTs. Mr CL WONG supplemented that the difference in sampling at randomly selected CTs and PACTs were indeed their different sampling locations within the buildings but should still be representative of the cleanliness of the internal plumbing systems of the buildings.

In view of zero detection of *E. coli* and no exceedance of residual chlorine in water samples taken at PACTs in previous years, it was anticipated that the detection of *E. coli* or exceedance of residual chlorine in water samples taken at randomly selected CTs in conjunction with the Enhanced Programme should be rare.

18. In view that there was no international guideline value for HPC, Dr Rita HO asked if there had been any action level set for HPC and if so, how it had been derived. In response, Mr Kelvin KWOK said that according to the Study, the threshold value for HPC would be set as "no abnormal change" from the background level, i.e. at 20 cfu/mL for Hong Kong currently. He added that HPC would be a good indicator to reflect the cleanliness or integrity of the water conveying system and any abnormal change in the HPC level should trigger an investigation of the water conveying system such as the internal plumbing systems of buildings. Mr Kelvin KWOK further advised that WSD was developing a new testing method for HPC with incubation time extended from the current 24 hours to 48 hours and a review of the threshold value would be made after collecting sufficient monitoring data in three to five years.

19. Dr Rita Ho further queried the follow-up actions to be taken and advice to be given to the public in case exceedance of the threshold value of HPC. Mr Kelvin KWOK advised that since HPC was not a health-based parameter in the HKDWS, exceedance of the parameter did not represent that the water was unsafe for consumption. Consumers and management officers of the relevant premises would be informed of the exceedance and advised to take follow-up actions, including investigation and cleaning of the internal plumbing system if necessary. Dr Rita HO pointed out that exceedance in the HPC/total coliform level indicated potential problem for cleanliness and integrity of the water distribution systems, including possible ineffectiveness of the disinfection process. As a precautionary measure, the affected occupiers should be advised to boil the water before using it for drinking or food preparation purposes until the completion of the investigation or cleansing of the internal plumbing system. She opined that it would be very confusing to the public if they were on one hand advised of the need to carry out follow-up actions such as cleansing of the inside service due to potential cleanliness problem but the water was still safe for consumption without boiling on the other hand. In addition, in the absence of retesting to be conducted by WSD, the cleansing work might not be carried out promptly by the building management in question. However, a Member shared the overseas experience that in general, boiling water advice would not be issued to the public for exceedance in HPC level since HPC was not a health-based parameter. Instead, investigation for the cause(s) of the exceedance would be taken as the first step.

[Post-meeting note: After review of the Members' comments and taking into account DH's advice, the advice will be given as follows: - According to WSD, exceedance of HPC does not represent that the water is unsafe for consumption and WSD suggests that preventive actions such as cleansing of the internal plumbing system be carried out. As a precautionary measure, DH advises the affected customers to boil the water before using it for drinking and food preparation purposes until the completion of actions such as cleansing of the internal plumbing system and rectification of the underlying cause of elevated HPC if it can be identified. If the affected consumers have health concern, they may consult their family doctor.]

20. The Chairman suggested that WSD should review Members' above comments in respect of the follow-up action to be taken in case of exceedance in HPC level. In the meantime, WSD would update the tables in Annexes 4 - 6 of the Paper on the summary of the drinking water quality monitoring programme and circulate it to Members for reference. **WSD**

Agenda Item 5: Proposed Framework for Reviewing Parameters in the Hong Kong Drinking Water Standards, Surveillance List and Watch List
(DWSAC Paper No. 3/2019)

21. Mr Kelvin KWOK briefed Members on the proposed framework for review of the parameters in the HKDWS, Surveillance List and Watch List. Members had no comment.

Agenda Item 6: Summary on International Water Quality Incidents

22. Mr Kelvin KWOK updated Members the review conducted by WSD on major international water quality incidents for the period from October 2018 to March 2019. A Member also shared several cases in Australia concerning excessive lead being found in the drinking water and the corresponding advice given to the customers in respect of flushing of the drinking taps before potable consumption. The Member added that low lead plumbing products were getting more popular in some overseas jurisdictions such as Australia and the United States. The Chairman stressed the importance of having efficient communication with the public on such issues bearing in mind the fast spreading of news through various media channels nowadays.

23. A Member suggested that WSD should gather worldwide information for comparing the percentage of Hong Kong population with treated water supply under surveillance with the global figures. Another Member added that there were Sustainable Development Goals of the United Nation on water quality and some key parameters like *E. coli*, might be relevant to the subject.

24. In response to a Member's concern about the possibility of rodent-associated virus getting into the drinking water supply system, Mr Kelvin KWOK replied that virus was not a major concern in the water supply of Hong Kong as residual chlorine in the water supply was very effective in deactivating virus in general. All Members noted.

Agenda Item 7: Any Other Business

25. Mr Alex CHU reported that DEVB had conducted surprise checks at a regional office and a water treatment works of WSD in April 2019. No issue that would compromise drinking water safety had been observed. Two to three more surprise checks would be conducted later this year. He added that DEVB had engaged an external party to conduct a third-party audit of the Drinking Water Quality Management System of WSD in 2019 Q3 and would update Members of the findings in the next meeting.

26. Mr Alex CHU and Mr Stanley CHAN, Chief Engineer/Special Duty of WSD, gave a joint presentation on the review on the drinking water safety regulatory regime. Mr Alex CHU presented the latest recommendations provided by the consultant engaged to conduct the study on developing a suitable drinking water safety regulatory regime for Hong Kong in April last year. Mr Stanley Chan presented the proposed enhancement of the regulatory control of plumbing works, plumbing materials and water using appliances. Members were reminded to keep the information regarding the above proposals confidential until the launch of public consultation on the proposed legislative amendments, which was scheduled to be held before the end of this year tentatively.

[Prof HO Kin Chung left at this juncture.] [The discussions are kept in strict confidence.]

27. There being no other business, the meeting was adjourned at 5:50 p.m.